UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,541	10/10/2003	Jeffrey Lane Williams	XIOT.022PA	2632

40581 7590 04/19/2006

CRAWFORD MAUNU PLLC
1270 NORTHLAND DRIVE, SUITE 390
ST. PAUL, MN 55120

EXAMINER	
TRUONG, LOAN	
ART UNIT	**PAPER NUMBER**
2114	

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

6

Office Action Summary	Application No.	Applicant(s)	
	10/683,541	WILLIAMS, JEFFREY LANE	
	Examiner	**Art Unit**	
	LOAN TRUONG	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2003*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-21* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Jones (US 5,479,653).

In regard to claim 1, Jones disclosed a method for providing RAID storage, comprising:

determining an enclosure associated with each of a plurality of storage devices (*drive sets are configure to RAID 0, 1, 4, 5, fig. 5a, 5b, 5c, col. 5 lines 31-35*) ;

performing a fault tolerance analysis on the storage devices (*array configuration that implements a maximum of data redundancy, col. 3 lines 14-17*); and

selecting a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system (*automatically reconfigures one or more of drives to other RAID configuration for maximum performance and redundancy and maintaining a high level of fault tolerance, col. 3 lines 17-25*).

In regard to claim 2, Jones disclosed the method of claim 1, wherein the performing a fault tolerance analysis further comprises considering a failure affecting all storage devices in an enclosure (*operation of disk array controller as disk drive failures occur, fig. 4, col. 6 lines 12-23).*

In regard to claim 3, Jones disclosed the method of claim 1, wherein the performing a fault tolerance analysis further comprises considering cable failures to the storage devices (*reconfiguration logic couple to disk drive failure detection logic which reconfigures one or more drives to different RAID configuration as disk failures occur, col. 5 lines 2-6).*

It is inherent that the fault tolerance analysis of Jones would consider any failures associated with the storage devices including cable failures.

In regard to claim 4, Jones disclosed the method of claim 1, wherein the selecting a distribution order for the storage devices within a RAID system further comprises obtaining a distribution that allows a RAID to be sustained even though an entire enclosure of storage devices fails (*disk array system can reconfigure itself to various configuration as drives failures occur, fig. 5a-e, col. 6 lines 12-67 and col. 7 lines 1-52).*

It is inherent that the fault tolerance analysis of Jones would reconfigure every time a drive failure occurs even if a whole sub drive sets fails.

In regard to claim 5, Jones disclosed a RAID controller, comprising:

a memory for storing data (*disk array, fig. 1, 152)*; and a processor (*Disk array controller, fig. 1, 150)*, coupled to the memory (*disk array, fig. 1, 152)*, the processor being configured for determining an enclosure associated with each of a plurality of storage devices, performing a fault tolerance analysis on the storage devices and selecting a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system (*Disk array controller further includes reconfiguration logic and failure detection logic, fig. 2, 150, 210, 220, col. 5 lines 2-6).*

In regard to claim 6, Jones disclosed the RAID controller of claim 1, wherein the processor is further configured to perform the fault tolerance analysis by considering a failure affecting all storage devices in an enclosure (*operation of disk array controller as disk drive failures occur, fig. 4, col. 6 lines 12-23).*

In regard to claim 7, Jones disclosed the RAID controller of claim 1, wherein the processor is further configured to perform the fault tolerance analysis by considering cable failures to the storage devices (*reconfiguration logic couple to disk drive failure detection logic which reconfigures one or more drives to different RAID configuration as disk failures occur, col. 5 lines 2-6).*

It is inherent that the fault tolerance analysis of Jones would consider any failures associated with the storage devices including cable failures.

In regard to claim 8, Jones disclosed the RAID controller of claim 1, wherein the processor selects a distribution order that allows a RAID to be sustained even though an entire enclosure of storage devices fails (*disk array system can reconfigure itself to various configuration as drives failures occur, fig. 5a-e, col. 6 lines 12-67 and col. 7 lines 1-52)*.

It is inherent that the fault tolerance analysis of Jones would reconfigure every time a drive failure occurs even if a whole sub drive sets fails.

In regard to claim 9, Jones disclosed a RAID storage system, comprising:

a plurality of storage devices disposed within storage device enclosures (*disk array, fig. 1, 152)*; and

a RAID controller (*Disk array controller, fig. 1, 150)*, coupled to the plurality of storage devices (*disk array, fig. 1, 152)*, the RAID controller determining an enclosure associated with each of a plurality of storage devices, performing a fault tolerance analysis on the storage devices and selecting a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system (*Disk array controller further includes reconfiguration logic and failure detection logic, fig. 2, 150, 210, 220, col. 5 lines 2-6)*.

In regard to claim 10, Jones disclosed the RAID storage system of claim 9, wherein the processor is further configured to perform the fault tolerance analysis by considering a failure affecting all storage devices in an enclosure (*operation of disk array controller as disk drive failures occur, fig. 4, col. 6 lines 12-23)*.

In regard to claim 11, Jones disclosed the RAID storage system of claim 9, wherein the processor is further configured to perform the fault tolerance analysis by considering cable failures to the storage devices (*reconfiguration logic couple to disk drive failure detection logic which reconfigures one or more drives to different RAID configuration as disk failures occur, col. 5 lines 2-6).*

It is inherent that the fault tolerance analysis of Jones would consider any failures associated with the storage devices including cable failures.

In regard to claim 12, Jones disclosed the RAID storage system of claim 9, wherein the processor selects a distribution order that allows a RAID to be sustained even though an entire enclosure of storage devices fails (*disk array system can reconfigure itself to various configuration as drives failures occur, fig. 5a-e, col. 6 lines 12-67 and col. 7 lines 1-52).*

It is inherent that the fault tolerance analysis of Jones would reconfigure every time a drive failure occurs even if a whole sub drive sets fails.

In regard to claim 13, Jones disclosed the RAID storage system of claim 9 further comprising a processor (*CPU, fig. 1, 122)* and a memory (*main memory, fig. 1, 126)* for storing program instructions for controlling the processor (*Driver software operating on CPU provides request to disk array controller, fig. 1, 122, 150, col. 5 lines 13-20).*

In regard to claim 14, Jones disclosed the RAID storage system of claim 9 further comprising a host (*CPU, fig. 1, 122, col. 5 lines 13-20)* coupled to the RAID controller

(Disk array controller, fig. 1, 150), the host providing software access to the RAID controller *(Driver software operating on CPU provides request to disk array controller, fig. 1, 122, 150, col. 5 lines 13-20).*

In regard to claim 15, Jones disclosed The RAID storage system of claim 9, wherein the RAID controller stripes data across an array of storage devices so that the array appears as one logical storage device unit *(RAID 0, col. 5 lines 13-24).*

In regard to claim 16, Jones disclosed a program storage device readable by a computer, the program storage device tangibly embodying one or more programs of instructions executable by the computer to perform a method for optimizing storage device distribution within a RAID, the method comprising:

determining an enclosure associated with each of a plurality of storage devices *(drive sets are configure to RAID 0, 1, 4, 5, fig. 5a, 5b, 5c, col. 5 lines 31-35)*;

performing a fault tolerance analysis on the storage devices *(array configuration that implements a maximum of data redundancy, col. 3 lines 14-17)*; and

selecting a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system *(automatically reconfigures one or more of drives to other RAID configuration for maximum performance and redundancy and maintaining a high level of fault tolerance, col. 3 lines 17-25).*

In regard to claim 17, Jones disclosed the program storage device of claim 1, wherein the performing a fault tolerance analysis further comprises considering a failure affecting all storage devices in an enclosure (*operation of disk array controller as disk drive failures occur, fig. 4, col. 6 lines 12-23).*

In regard to claim 18, Jones disclosed the program storage device of claim 1, wherein the performing a fault tolerance analysis further comprises considering cable failures to the storage devices (*reconfiguration logic couple to disk drive failure detection logic which reconfigures one or more drives to different RAID configuration as disk failures occur, col. 5 lines 2-6).*

It is inherent that the fault tolerance analysis of Jones would consider any failures associated with the storage devices including cable failures.

In regard to claim 19, Jones disclosed the program storage device of claim 1, wherein the selecting a distribution order for the storage devices within a RAID system further comprises obtaining a distribution that allows a RAID to be sustained even though an entire enclosure of storage devices fails (*disk array system can reconfigure itself to various configuration as drives failures occur, fig. 5a-e, col. 6 lines 12-67 and col. 7 lines 1-52).*

It is inherent that the fault tolerance analysis of Jones would reconfigure every time a drive failure occurs even if a whole sub drive sets fails.

In regard to claim 20, Jones disclosed a RAID controller, comprising:

means for storing data (*disk array, fig. 1, 152)*; and

means, coupled to the means for storing data (*disk array, fig. 1, 152)*, for processing instruction to determine an enclosure associated with each of a plurality of storage devices (*Disk array controller, fig. 1, 150)*, to perform a fault tolerance analysis on the storage devices and to select a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system (*Disk array controller further includes reconfiguration logic and failure detection logic, fig. 2, 150, 210, 220, col. 5 lines 2-6).*

In regard to claim 21, Jones disclosed a RAID storage system, comprising:

means for providing storage space (*disk array, fig. 1, 152)*, the means for providing storage space being enclosed within means for grouping the means for providing storage space (*drive sets are configure to RAID 0, 1, 4, 5, fig. 5a, 5b, 5c, col. 5 lines 31-35)*; and

means, coupled to the means for providing storage space, for determining an enclosure associated with each of a plurality of storage devices (*disk array, fig. 1, 152)*, performing a fault tolerance analysis on the storage devices and selecting a distribution order for the storage devices within a RAID system based on the fault tolerance analysis to provide maximum fault tolerance for the RAID system (*Disk array controller further includes reconfiguration logic andfailure detection logic, fig. 2, 150, 210, 220, col. 5 lines 2-6).*

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Loan Truong whose telephone number is (571) 272-2572. The examiner can normally be reached on M-F from 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Loan Truong
Patent Examiner
AU 2114

ROBERT BEAUSOLIEL
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100